Remarks:

Claims 1 to 6 and 9 to 20 remain in this application and, as amended, are presented for reconsideration. Claims 21 to 30 have been canceled without prejudice in view of a restriction. Claims 7 and 8 have been incorporated into Claim 1, and similar limitations have been placed into independent Claims 11 and 13.

Independent Claims 1, 11, and 13 have been amended to emphasize the limitation that the milk (or other food product) is denatured by holding the same at substantially 175 degrees F for sixty seconds. This is a step that prevents the milk solids from settling out and coating the heat exchanger walls at the high temperature stage regenerator and the heater. Denaturing in this fashion permits the food product to flow at a speed that achieves a very high regeneration efficiency (up to 90 percent) without the proteins depositing themselves on the heat exchanger walls, so the UHT pasteurization process can be run for an extended period without having to shut down for cleaning. The gentle heating also results in less noticable off- or scalded flavors in the UHT product. The need for denaturing seems to be missed in the references, and the references do not suggest the step of actually holding the product at the denaturing temperature (e.g., 175 ° F) for a sufficient time to denature the product properly (e.g., 60 seconds or longer).

McElroy U.S. Pat. 3,567,470 shows only the standard "legal" pasteurization holding tube 16 (see col. 2, lines 50 - 59), where the hold time is sixteen seconds. This is enough time for "legal" pasteurization, but not enough time to denature the product so that its proteins will not deposit in the high temperature stage.

Hasting U.S. Pat. 4,534,986 shows only an outlet line 4, homogenizer 5, and a second line 6 to the upper heat exchanger (7, 8). There is no hold tube in this section, and there is no mention of any particular dwell time to be observed. Also, Hasting has the milk emerging from the first stage 2, 3 at 74° C (which is 165° F). Hasting only has a UHT hold tube 20, and that is at the UHT temperature 140° C, where the hold time is 4 seconds (see col. 3, lines 41 - 49).

The Fennema *Food Chemistry* reference only states that denaturing of whey proteins will occur at temperatures above 70° C (158° F). There is nothing in this reference that suggest the

step of holding the product at a denaturing temperature of 175° F for sixty seconds, and no motivation to include such a step in a regenerative process for ultra high pasteurization of milk or other food product.

Applicant urges that the invention, as recited in the claims now being asserted, is distinctly different from what is shown in the references, and Applicant incorporates by reference the comments and arguments made earlier concerning the McElroy reference.

The approach taken according to this invention is completely different from the conventional process of heating the milk as quickly as possible up to the UHT temperature, and relying on high velocities to avoid deposition of milk proteins on the heat exchanger walls. Instead, with the process of the present invention heat is applied gradually to the liquid product, and this permits the process to be carried out with a very high degree of regeneration (i.e., 90 %). The heating medium at the UHT stage, i.e., hot water or another suitable heated liquid, enters the UHT heater about four to five degrees F above the temperature of the milk exiting (e.g., sterile milk at 280° and hot water at 284°F). With the gradual heating at these low temperature differentials, the milk does not acquire any objectionable "cooked" or scalded flavors. In order to ensure that the milk proteins *not* deposit or coat the heat exchanger tubes in the upper regenerator and hot water heater, the milk is held at a denaturizing temperature (175°) for a suitable length of time (sixty seconds) so that the proteins are stabilized and remain in the milk when it is heated up to the UHT temperature. This eliminates protein deposits so that there are no flow blockages in those stages.

McElroy does not take any steps concerning denaturing the product nor does McElroy do anything concerning the problem of protein deposits in the UHT stages.

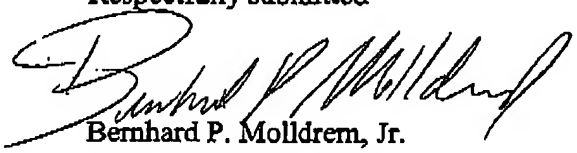
Hasting tries to avoid denaturing problems (including production of off flavors) by adjusting the temperature-time profile, i.e., using a high "turndown ratio" to minimize the time the milk is at an elevated temperature. This is discussed at col. 3, line 63 to col. 4, line 29 of this reference. There are not many details provided here, but it is clear that there is no hold tube to keep the milk at 175° F (80° C) for sixty seconds, as required in this invention.

The denaturing and the importance of this step, in respect to the present invention, are discussed e.g. at page 10, lines 9 to 12, page 11, line 24 to page 12, line 1, and page 12, lines 10 to 16. The milk is held at this temperature (e.g., 175° F) for a sufficient time for denaturing to take place, which depends on the nature of the product. For some typical milk products, the hold time for denaturing can be 60 seconds to 300 seconds. This is longer than the "legal" time (e.g., 15 -16 seconds) required to make the product safe for consumption.

The dependent claims 2 to 6, 9, 10, 12, and 14 to 20 all depend from claims that are believed to be allowable.

In view of the foregoing amendments and remarks, Applicant respectfully urges that the Claims now being asserted, namely, Claims 1 to 6 and 9 to 20 clearly define over the prior art, and Applicant requests early and favorable consideration.

Respectfully submitted



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